Activation of Spider Spermatozoa [1]

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Spermatogenesis in spiders has been studied by a number of competent investigators, including Gilson (1884), Bösenberg (1905), Wallace (1909), Sharma and Gupta (1956), and Tuzet and Manier (1959). Fairly typical flagellate spermatozoa are produced but these forthwith roll up or round up into small, compact, non-motile forms. At this point their history becomes obscure and it has only been surmised that they may later resume their flagellate condition inside the body of the female.

Because of this scarcity of information on the morphology and movement of spider spermatozoa, archnologists and cytologists may be interested in a fortuitous observation. During a morphologic investigation of spider palpal fluid, actively moving spermatozoa of *Tetragnatha seneca* Seeley were observed and studied.

Seminal fluid was teased from the palpi of several genera of male spiders and mounted on microscope slides in a variety of media with several techniques. In a mount prepared by teasing palpal fluid of *T. seneca* into a droplet of 1.0% technical NaCl in distilled water and covering immediately with a cover-slip, activation and movement of spermatozoa were observed. Although thousands of spermatozoa were contained on the slide, only a few became active even though the slide was maintained at the same temperature, 80° F, for several days.

The spermatozoa were observed and studied at 500 to 750 × magnifications with a phase-contrast microscope. Each spermatozoon was elongate with a slightly enlarged, rounded "head" and a sub-terminal flagellum. Measurement of 10 quiescent individuals gave the following means: body length 16.9 μ, flagel-

[1] Florida Agricultural Experiment Stations Journal Series No. 2082.

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lum length 29.9 μ. Body width and head length and width were indeterminable at the magnifications available.

Activation was evidenced by the initiation of a whip-like flagellar motion. The spermatozoon then thrashed about until it was completely free. In a few instances, the anterior end of the body or the head remained trapped within what appeared to be a spherical capsule. Most of the spermatozoa swam freely, after a short struggle. The swimming motions were quite similar to those described for the sperm of other animals, Rothschild (1956) and Bishop and Austen (1957). Vibrations of the flagella of vigorous spermatozoa were too rapid for observation but in weak or dying individuals seemed to be a repeated series of backwardly flowing S-curves. Moving spermatozoa also sustained an apparently rotary vibration of the anterior half of the body which made them seem to have a broadly rounded bead and a tapered body. This anterior body movement appeared to be a reaction to the flagellar vibrations but could not be positively determined.

Since this original observation, all efforts to obtain and study active spermatozoa of this and several other species of spiders have failed. Activation has occurred during staining procedures or when slides were not under observation.

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